Section 26
Steel Erection

This section sets forth Reclamation's requirements for erecting steel structures. It covers the following specific areas:

- General Requirements
- Permanent Flooring
- Temporary Flooring
- Other Flooring
- Structural Steel Erection
- Plumbing-Up
- Bolting
- Riveting
- Fire Protection

26.1 General Requirements for Erecting Steel Structures

Storage, handling, and erecting of steel structures, buildings, or structural components or members must conform to the applicable requirements of these standards and the current edition of American National Standards Institute (ANSI) A10.13, "Safety Requirements for Steel Erection."

26.1.1 **Fall Protection**. Develop a fall protection program before starting steel erection. Include all phases of the steel erection in the program and eliminate, to the extent possible, employee exposure to falls.

a. Detail the steps to be taken to provide protection for employees exposed to potential falls.

b. Provide a training program that enables all involved employees to recognize the fall hazards and the procedures to follow to minimize the hazard.

26.2 Requirements for Installing Permanent Flooring

26.2.1 **Installation**. Install permanent floors as the erection of structural members progresses. Install no more than eight stories between the erection floor and the uppermost permanent floor, except where the design maintains the structural integrity.

26.2.2 **Bolting and Welding**. Erect no more than four floors or 48 feet of unfinished bolting or welding above the foundation or the uppermost permanently secured floor.

26.3 Requirements for Installing Temporary Flooring

26.3.1 **Planking**. Solidly plank or deck the derrick or erection floor over its entire surface except for access openings. Planking or decking must be sufficiently thick and strong to

supporting the working load. Never use planking less than 2 inches thick, full dimension undressed. Lay planking flush and secure it to prevent movement.

26.3.2 **Skeleton Steel Erection**. Where erecting skeleton steel, maintain a tightly planked and substantial floor within two stories or 30 feet, whichever is less, below and directly under that portion of each tier of beams on which employees are performing any work. However, the preceding does not apply when gathering and stacking temporary floor planks on a lower floor in preparation for transferring such planks for use on an upper floor. If installing a tightly planked and substantial floor is not practicable, install safety nets.

26.3.3 **Safety Nets**. On buildings or structures not adaptable to temporary floors, and where scaffolds are not used, install and maintain safety nets whenever the potential fall distance exceeds two stories or 25 feet. The nets must clear the surface of structures below.

26.3.4 **Temporary Planking Removal**. Remove temporary planking successively, working toward the last panel of temporary floor, so that employees work from the planked floor. Protect employees removing planks from the last panel by safety harness with safety lines attached to a catenary line or other substantial anchorage.

26.4 Requirements for Installing Other Flooring

26.4.1 **Double-Wood Floors**. In erecting buildings with double-wood floor construction, complete the rough flooring, including the tier below the one on which floor joists are being installed, as the construction progresses.

26.4.2 **Single-Wood Floor**. For single-wood floors or other flooring systems, keep the floor immediately below the story where the floor joists are being installed planked or decked over.

26.5 Requirements for Structural Steel Erections

26.5.1 **Solid-Web Structural Members.** In placing solid-web structural members, do not release the hoisting line until the member is secured with at least two bolts or the equivalent at each connection. Draw the bolts up wrench tight.

26.5.2 **Open-Web Joists**. Place open-web steel joists on structural steel framework only after such framework is permanently bolted, riveted, or welded.

26.5.3 **Bar Joists**. In steel framing, where bar joists are used and the columns are not framed in at least two directions with structural steel members, field bolt a bar joist at the columns to provide lateral stability during construction.

26.5.4 **Long-Span Joists**. Where long-span joists or trusses 40 feet or longer are used, provide lateral stability by installing a center row of bolted bridging before slacking the hoisting line.

26.5.5 **Securing Structural Members**. Securely bolt or fasten into position each structural steel member before releasing the loadline. When setting steel trusses, temporarily cross brace them until permanent bracing is installed.

26.5.6 **Taglines**. Use a tagline or guide rope on all hoisted loads that expose employees to the swing of the load.

26.5.7 **Temporary Support**. Before lifting falls are unhitched, either draw the anchor bolts down tightly when columns are being set on base plates or shims, or guy and support them to prevent collapse.

26.5.8 **Connectors.** Whenever possible, "connectors" must straddle the beam instead of walking along the top flange.

26.6 Requirements for Plumbing-Up

26.6.1 **Connections**. Secure connections of the equipment used in plumbing-up. Properly secure turnbuckles to prevent unwinding when under stress.

26.6.2 **Guys**. Position plumbing-up guys and related equipment so that employees can work on the connection points. Remove the plumbing-up guys only under the supervision of a competent person.

26.7 Requirements for Bolting

26.7.1 **Drift Pins**. When knocking out bolts or drift pins, provide a means to keep them from falling.

26.7.2 **Impact Wrenches**. Equip impact wrenches with a locking device to retain the socket.

26.7.3 **Containers**. Provide containers for storing and carrying bolts, drift pins, and rivets. Secure the containers against accidental displacement when aloft.

26.7.4 **Drilling and Reaming.** Two employees must operate drilling and reaming machines unless the handle is firmly secured to resist the torque reaction of the machine if the reaming or drilling bit should bind.

26.8 **Requirements for Riveting**

26.8.1 **Riveting Hammers**. Properly install a safety wire on the snap and on the handle of the pneumatic riveting hammer and use it at all times. The wire must be at least No. 9 (B&S gauge) leaving the handle, and the wire on the snap must be at least annealed No. 14, or equivalent.

26.8.2 **Removing Rivets**. When knocking off our backing out rivet heads, provide a means to keep them from falling.

26.9 **Requirements for Fire Protection**

26.9.1 **Fire Protection**. In accordance with the section, "Fire Prevention and Protection," develop a fire protection and prevention plan before erecting any major structure.

26.9.2 **Welding and Cutting**. Take precautions to prevent sparks or fires in accordance with the section, "Hand Tools, Power Tools, Pressure Vessels, Compressors, and Welding."

26.9.3 **Riveting.** Only rivet in the vicinity of combustible material when fire extinguishers or hoselines are readily available to extinguish fires.